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DESCRIPTION OF INVENTION
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SU 841 628

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Ognegasitel'noe sredstvo

FIRE-EXTINGUISHING MEANS

The invention pertains to fire-extinguishing equipment, and may be used for the fire-fighting of substances, whose combustion cannot be quenched by water or other fire-extinguishing means, e..g, alkali metals.

Powder compositions for the extinguishing of the combustion of alkali metals on the basis of soda ash, having additives of the salts of fatty acids, as well as dry albumin and vitreous enamel, are known [1] and [2].

The disadvantage of these powders consists in that under the action of the atmospheric moisture, the composition loses its flowability, clogs the pipelines, and over the course of the extinguishing brings about an additional deflagration of the already burning alkali metal.

Fire-extinguishing means for the extinguishing of the combustion of various liquids, which means are on the basis of sorbents, e.g., silica gel, saturated with a filler, namely - tetrafluorodibromoethane, are also known [3].

However, those means do not possess sufficient effectiveness when the burning alkali metals are to be extinguished.

Among the known means, the composition, which most resembles the proposed composition, is the fire-extinguishing means, including sorbent - pearlitic sand, whose pores are filled with tetrafluorodibromoethane [4].

That means also does not possess enough effectiveness when fires, caused by burning of alkali metals are to be extinguished. Over the course of the extinguishing, the fire-extinguishing material is immersed under a layer of liquid burning metal, and does not insulate the surface of combustion with respect to the ambient medium. The use of that means is limited because when it is used, toxic products are formed, particularly when the fire-extinguishing is undertaken in closed premises. Moreover, special, hermetically sealed containers are necessary for the storage, at a specified temperature, accompanied with periodic control of the composition.

It is an object of the invention to improve the effectiveness of fire-extinguishing when alkali metals are burning, and to expand the area of application.

The set objective is achieved as a result of the fact that the fire-extinguishing means, which comprises a sorbent,

saturated with a filler, contains a zeolite in its capacity as sorbent, and argon in its capacity as filler.

The fire-extinguishing means is embodied in the form of pellets, blocks or bars.

It is known that zeolites possess a great adsorption capacity with respect to gas. At high pressure and elevated temperature, some zeolites can absorb such gases, which cannot be adsorbed under standard conditions, due to the large size of their molecules. For example, at 350° C and a pressure of 2,000 atm, the zeolite, KA, adsorbs noticeable amounts of argon, up to 100 cm^3/g. After having been cooled to room temperature, the gas (argon) remains entrapped in the interstices of the zeolite. Such a phenomenon is known as "encapsulation". Such zeolites, having a gas, blocked in them, can be stored for long periods of time. In order for the gas to be de-sorbed, the zeolite should be heated up to high temperature.

The proposed invention makes use of the phenomenon, known as "encapsulation', in order for the fire-extinguishing properties of the solid particles of the sorbent, e.g., zeolite, to be improved. In order for the extinguishing to be carried out, it is necessary that the solid particles are submitted to the surface of combustion. While retaining themselves on the surface of combustion, the solid particles (pellets) of zeolite hinder the access of air to the surface of combustion. When the actual pellets are heated, an ejection (desorption) of a considerable amount - up to 100 cm^3/g - of inert gas, argon, which has

previously been adsorbed, takes place. The higher the temperature of combustion, the more intensive the expulsion of the inert gas out of the micropores of the zeolite. The density of the argon exceeds the density of the air, in such a way the argon will displace the air out of the combustion zone, considerably lowering - in doing so - the oxygen concentration, as a result of which it subsequently contributes to the termination of the combustion of the majority of combustible materials. Concurrently, the inert gas extracts or removes out of the combustion zone a considerable amount of heat, as a result of which the temperature of the combustible medium decreases, and a deceleration of the combustion process takes place.

E x a m p l e: In order to verify the fire-extinguishing proprieties of the zeolite of the brand KA, liquid sodium, which has been preheated in tank to 500°C, is squirted or pressed out into a metallic drip pan [griddle], having an area of 1 square meter. The volume of the sodium, which has been squirted out constitutes 10 liters. When the sodium is squirted or squeezed out of the tank into the drip pan, it spontaneously ignites. The zeolite pellets, having a size of 3 to 4 mm, are predegassed or deaerated beforehand.

0.5 kg of zeolite are advanced or fed at one sitting upon the burning surface of the sodium, while the entire surface of the combustion is filled up with a layer of zeolite, having a thickness of (3 - 4) pellets. After the pouring or filling up of the entire surface, the combustion of the sodium completely

ceases. An oozing or infiltration of the liquid metal into the powder layer, and, also, a formation of secondary centers of combustion, as well as explosion effects, backfires and crackling - when the combusting surface of the sodium is covered with zeolite pellets -is not observed. The removal out of the metal drip-pan of the mass, which has remained after the extinguishing has been completed, is not associated with great problems.

The improved effectiveness of extinguishing burning alkali metals, e.g., sodium, with the help of solid zeolite particles, whose micropores are saturated with inert gas, namely argon, is predicated upon the fact that in the said extinguishing means, the fire-extinguishing properties of the solid substances - i.e. their ability to generate an insulating effect by means of their own mass against the combustion process - as well as the property of the argon - due to its high density - to displace the air out of the combustion zone at the outlet of the zeolite micropores, lowering thus the oxygen concentration - are jointly manifested. Above the surface of combustion as well as in the interstices between the zeolite particles (pellets), there is generated an inert-gas cushion, which is stable, and hinders the direct oxygen access to the combustion interface of the substances. Because the specific weight of the zeolite is considerably less than the specific weight of the liquid sodium, the zeolite pellets are always retained on the sodium surface over the course of the combustion.

With the same effectiveness, the zeolite pellets, having pores, which are saturated beforehand with inert gas, may be used for the extinguishing of the combustion of various petroleum products on the surface of an impounding reservoir. When the initial contact between the zeolite pellets and the water occurs, the inert gas will be actively displaced out of the zeolite, due to the adsorption of the water, whereby a protective gas blanket or screen is thus created, and the combusting vapors will be pronouncedly diluted, as a result of which a deceleration and suppression of the focus or center of combustion finally takes place.

Possessing sufficient crushing strength and abrasion strength, the zeolite pellets can be advanced onto the surface of combustion with the help of various mechanical means along hoses and pipelines. The hygroscopicity of the zeolite pellets, whose micropores are saturated with inert gas, is very low, while the a caking or agglomeration does not at all exist.

CLAIM

1. Fire-extinguishing means, comprising a sorbent, saturated with a filler, c h a r a c t e r i z e d in that with an aim of increasing the effectiveness of extinguishing in the case of burning of alkali metals, and an expansion of the area of application, it contains a zeolite as sorbent, an argon in its capacity as filler.

2. Fire-extinguishing means, as claimed in claim 1, c h a r a c t e r i z e d in that it is embodied in the form of pellets, block or bars.

References,
taken into account during the patent examination process:

1. USSR Author's certificate No. 125 141, IPC: A 62 D 1/00, 1959.
2. USSR Author's certificate No. 133346, IPC A 62 D 1/00, 1960.
3. USSR Author's certificate No. 232761, IPC: A 62 D 1/00, 1963.
4. USSR Author's certificate No. 423323, IPC: A 62 D 1/00, 1971.

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